

**2004 GALVESTON BAY INVASIVE SPECIES RISK ASSESSMENT  
INVASIVE SPECIES SUMMARY**

Created by: Environmental Institute of Houston, University of Houston-Clear Lake  
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<b>Common Name:</b> Northern snakehead, Amur snakehead, Eastern snakehead
<b>Latin Name:</b> <i>Channa argus</i> (Syn. <i>Ophicephalus argus</i> , <i>Ophiocephalus argus</i> , <i>Ophicephalus nigricans</i> , <i>Ophicephalus pekinensis</i> )
<b>Category:</b> Aquatic Animal
<b>Place of Origin:</b> China
<b>Place of Introduction:</b> New York and Maryland
<b>Date of Introduction:</b> 2000
<p><b>Life History:</b> “Observations of this Snakehead breeding in its natural habitat show that a large floating nest (up to 100 cm in diameter) is constructed, consisting of plant fragments. This can be mostly found in fairly shallow water with dense vegetation. After spawning, an average of 50,000 eggs are fertilized. Nearly three-quarters of the egg contents consists of oil, so the eggs float freely to the nest. Here they are guarded by the male. At a temperature between 23 - 25 °C and after a period of 36 hours they hatch from the egg.</p> <p>Three days later the young fry have absorbed their yolk sac and at the size of 7-8 mm, they will start searching for small water insect larvae. After that, they consume large quantities of smaller fish, tadpoles etc. and by the end of their first year, will attain a size of 20 cm (<a href="http://www.fishace.demon.co.uk/snake/12argus.html">http://www.fishace.demon.co.uk/snake/12argus.html</a>).”</p> <p>“Can stay out of the water for 3 to 4 days at temperatures ranging from 10 to 15°C. Matures at the age of 2 years and length of 30 cm (<a href="http://freshaquarium.about.com/gi/dynamic/offsite.htm?site=http://www.fishbase.org/Summary/SpeciesSummary.cfm%3FID=4799">http://freshaquarium.about.com/gi/dynamic/offsite.htm?site=http://www.fishbase.org/Summary/SpeciesSummary.cfm%3FID=4799</a>).”</p>
<p><b>Growth/Size:</b> “The largest size recorded in literature is 800 mm and a fish of 8 years old was recorded at 760 mm. (Amanov 1974) (<a href="http://www.fishace.demon.co.uk/snake/12argus.html">http://www.fishace.demon.co.uk/snake/12argus.html</a>).”</p>
<p><b>Feeding Habits/Diet:</b> “Their diet is predominantly fish, however they will eat insects, crustaceans, worms, tadpoles, frogs, and even snakes (<a href="http://64.84.55.18/ussurvey/abo020/abo020_pop.html">http://64.84.55.18/ussurvey/abo020/abo020_pop.html</a>).”</p>
<p><b>Habitat:</b> “Their preferred habit is shallow ponds and streams where the water is still, and the bottoms muddy with dense vegetation. Are able to withstand extreme cold (<a href="http://64.84.55.18/ussurvey/abo020/abo020_pop.html">http://64.84.55.18/ussurvey/abo020/abo020_pop.html</a>).”</p>
<p><b>Physical Description:</b> “The upper surface has a brownish-green background colour and numerous (9-13) black blotches. These have a lighter centre that is sometimes edged in white, above the lateral line. There are bars under the dorsal base (dependant on age). The mid-section is a yellowish-grey while the reddish-white abdomen has streaks above the anal (dependant on age).</p> <p>The upper parts of the head have three paired bars and on the sides can be seen two broad stripes; one starting at the snout, running through the eye to the gill cover, whilst the lower curves downwards and ends at the edge of the gill cover.</p> <p>The fins are yellow, the dorsal, anal and caudal are spotted black.</p> <p>Sub-species and colour variants:</p> <p><u><i>Channa argus kimurai</i></u> (Shih 1936)</p> <p>This fish was described from two specimens of length 185 mm and 250 mm and can be distinguished by its variation in body proportions. In particular, the lower dorsal profile and differences in the arrangement of teeth. The body colour is all white, a complete contrast to <i>C. argus</i>. Above the lateral line, some of the scales have a grey centre. Vertical fins are tipped grey.</p> <p><u><i>Channa argus warpachowskii</i></u> (Berg 1949)</p> <p>This larger variant can attain a size of 800 mm and a weight of 7 kg. Differences are; higher than average ray counts in the dorsal (50-53) and anal (33-38) fins, and smaller scales. The irregular blotches on the side of the body are dark brown, edged with black and the lower part of the head is covered with small, dark brown speckles. (<a href="http://www.fishace.demon.co.uk/snake/12argus.html">http://www.fishace.demon.co.uk/snake/12argus.html</a>).”</p>

**Management Recommendations / Control Strategies:** include references for existing site-specific strategies

Draft management plan specific to the McQuilliam pond in Crofton, Maryland where the fish was first discovered on May 18, 2002.

1. "The Panel recommends the use of rotenone to kill the fish in MacQuilliam pond as well as Berkshire ponds (to ensure that the fish are not harbored in these nearby bodies of water) based on the following:
  - a. Rotenone should be applied to the pond with both surface spray application and injected underwater over the entire pond sufficient to achieve an effective dosage of at least 3 ppm (see Appendix 2 for rationale for that dosage).
  - b. Approximately one week prior to the rotenone treatment, floating plants should be sprayed with glyphosate. Based on field assessment of the potential interference with rotenone application, treatment of submerged vegetation with diquat dibromide or 2,4-D should also be considered at that time. Concentrates or rates should comply with standard application recommendations and MDE permit requirements.
  - c. An appropriate window of treatment should be selected (based on the above hydrological assessment) and overflow barriers erected to minimize the risk of any introduction of rotenone or herbicide to the Little Patuxent River.
  - d. If available, some juvenile snakeheads should be placed in cages in the MacQuilliam pond during the rotenone application as an in situ bioassay to verify lethal dosage. Dead and moribund fish rising to the surface of the pond should be quickly removed, examined for the number and size of snakeheads, and buried.
2. The Panel recommends that standard fish survey techniques be applied (seining and electrofishing) to determine if any fish survived the application of rotenone. If so, rotenone should be re-applied. Occasional monitoring of the ponds should be conducted over the next two years. Restocking with desired fish species can be considered on that basis.

Preventing Future Introductions of Potentially Invasive Fish

On July 23, 2002 the Secretary of the Interior proposed that the 28 snakehead species be added to the list of injurious species, which would prohibit the importation of the fish anywhere in the United States and make it illegal to transport the fish across state lines. This measure would go into effect in 60 days. This would go a long way to restrict domestic sources of these alien species in a way that State laws and regulations could not. However, under this federal authority it would still be legal to possess snakeheads in Maryland and other states without such explicit prohibition, thus continuing the risk of purposeful or accidental introduction of these species into Maryland waters. This as well as prevention of the future introductions of other potentially invasive, non-native fish species will be addressed in the Panel's second report to the Secretary of Natural Resources to be delivered on or before September 1, 2002 ([http://www.dnr.state.md.us/irc/ssap\\_report.html](http://www.dnr.state.md.us/irc/ssap_report.html))."

**References:**

1. <http://www.fishace.demon.co.uk/snake/12argus.html> Snakeheads of the world – Channa argus.
2. <http://dogs.about.com/z/js/tp01.htm?zPad=>. Shirly Sharpe. 2002. Attack of the Killer Snakeheads: Guess who came to dinner in Crofton?. July 28.
3. [http://64.84.55.18/ussurvey/abo020/abo020\\_pop.html](http://64.84.55.18/ussurvey/abo020/abo020_pop.html). Shirly Sharpe. Q & A - Tell me about snakeheads Chinese snakeheads invade Maryland accessed December 29, 2002.
4. [http://www.dnr.state.md.us/irc/ssap\\_report.html](http://www.dnr.state.md.us/irc/ssap_report.html). Snakehead Scientific Advisory Panel First Report to the Maryland Secretary of Natural Resources July 26, 2002
5. <http://www.dnr.state.md.us/fisheries/snakeheadinfosheet.html>. Maryland Department of Natural Resources northern snakehead press releases and information.
6. Shih, H.J. 1936. Notes on the labyrinth fishes of China. Bulletin Fan Memorial Institute Biology. (Zoology). 3(Part 3): 67-97.
7. Berg, L.S. 1949. Freshwater fishes of the U.S.S.R. and adjacent countries. Vol.3. pp.75-77. (Israel Programme for Scientific Translations, Jerusalem, 1965).